**Types of organic reactions**

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| **Reaction type** | **Definition** | **Explanation** |
| **substitution** | **an atom (or group of atoms) is replaced by another atom (or groups of atoms)** | **a bromine atom replaces one hydrogen atom**  ***eg. bromine water with an alkane in uv light and taking 10 mins;***  ***this will produce HBr and bromoalkane*** |
| **addition** | **a double bond breaks and atoms (or group of atoms) add onto either side of the double bond** | **in an alkene the double bond breaks and one hydrogen atom and one chlorine atom bond to each of the carbon atoms that were on either side of the double bond**  ***eg HCl reacting with an alkene to produce an alkane*** |
| **hydrogenation**  ***(a type of addition reaction)*** | **a double bond breaks and hydrogen atoms add onto either side of the double bond** | **in an alkene the double bond breaks and one hydrogen atom bonds to each of the two carbon atoms that were on either side of the double bond**  ***eg alkene with hydrogen to form an alkane*** |
| **bromination**  ***(a type of addition reaction)*** | **a double bond breaks and bromine atoms add onto either side of the double bond** | **in an alkene the double bond breaks and one bromine atom bonds to each of the two carbon atoms that were on either side of the double bond**  ***eg Br2 and alkene produces 1,2-dibromoalkane*** |
| **hydrolysis**  ***(a type of addition reaction)*** | **a double bond breaks and a hydrogen atom and OH group add onto either side of the double bond** | **in an alkene the double bond breaks and an OH group bonds to one of the carbon atoms on the double bond while a hydrogen atom bonds to the other carbon atom which was on the other side of the double bond**  ***eg alkene reacting with water and dil H2SO4 to form an alcohol*** |
| **oxidation**  ***(a type of addition reaction)*** | **a half reaction that involves a loss of electrons or an increase in oxidation number** | **the oxidation of a primary alcohol using acidified Potassium permanganate (or dichromate) which results in the addition of an oxygen atom with a double bond to the carbon atom of the alcohol bonded to the OH group, thus forming a carboxylic acid**  **eg *primary alcohol reacting with acidified KMnO4 purple 🡪 colourless* or**  ***acidified K2Cr2O7 orange 🡪 green) to form a carboxylic acid*** |
| **elimination** | **an atom (or group of atoms) is removed and a double bond is formed between the carbon atoms from which the atoms (or group of atoms) were removed** | **in an alcohol the OH group and a hydrogen atom (forming water) are removed from the molecule and a double bond forms between the two carbon atoms where the OH group and H atom used to be**  ***eg reaction of an alcohol with concentrated H2SO4 to produce an alkene*** |
| **acid base reaction**  ***(reaction of an acid with a base)*** | the reaction of an acid (a proton (H+) donor) with a base | **carboxylic acid reacting with sodium carbonate to form a salt (-anoate), water and carbon dioxide or an amine (a base) reacting with hydrochloric acid to form a salt and water. Acids are proton (H+) donors and bases are proton acceptors.**  **eg carboxylic acid reacting with Na2CO3 or an amine reacting with HCl** |

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